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International Transboundary Territories in the South of the Russian Far East and their Role in Sustainable Natural Resource Use in Border Regions*

극동러시아 남부의 국제 초국경 영역과 지속가능한 자원활용을 위한 역할*

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Abstract : Increased integration of the countries of East Asia is occurring following the geopolitical changes that took place after the collapse of the USSR. In a geographical sense, establishment of external economic links is occurring in special territories that include the border regions of two or more countries. These territories have come to be called international transboundary territories. In this article the characteristics of international transboundary territories are analyzed, definitions are given. Division of international transboundary territories in the south of the Russian Far East into districts has taken place; examples of their hierarchical classifications based on the geosystem of V.B. Sochava are provided. Guidelines for further research on transboundary territories to develop sustainable natural resource use programs in border regions of these countries are outlined.

Key Words : sustainable nature use, geosystem, international transboundary territories, regional development

요약 : 소련의 붕괴 이후 지정학적 변화가 진행되면서 동아시아 국가의 통합이 증가하고 있다. 지리적 의미에서 외부 경제 연계의 성립은 둘 이상의 국가 간 국경 무역을 포함하는 특별한 영역에서 발생한다. 이러한 영역은 국제 초국경 영역으로 불리게 되었다. 본 논문에서는 국제 국경 영역의 특성을 분석하고 정의를 내린다. 극동 러시아의 남부에 위치한 국제 국경 영역을 몇 개의 구역으로 구분한다. 예를 들면, V.B. Sochava의 지오시스템(geosystem)체계에 기반한 위계적 분류를 행한다. 이러한 국가의 국경 지역에서 지속가능한 자연 자원 이용 프로그램을 개발하기 위한 국경 영역에 대한 향후 연구 지침도 요약되어 있다.

주요어 : 지속가능한 자연 이용, 지오시스템, 국제 초국경 영역, 지역 개발

1. Introduction

The geopolitical situation in the south of the Russian Far East[1)] has been in a state of change since the collapse of the Soviet Union. The role of seaports on the Pacific Coast of Russia and the economic potential of the trans-Siberian railway have grown significantly. For instance, the position of the Russian state border has changed. Now, most of the state boundary between Russia and China is in the south of the Russian Far East: Primorskii Krai, Khabarovskii Krai, Jewish Autonomous Oblast and Amurskii Oblast. A much smaller portion of this border runs between Chitinskii Oblast of Russia and the Inner Mongolian Autonomous Region of China. There is a border in Russia's far southeast with North Korea, a country moving along its own path to economic development.

One result of the geopolitical changes in the Russian Far East is expanded integrated ties, both bi-

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lateral (Russia - PR of China; Russia - DPRK) and among administrative districts of these countries (krais and oblasts in the south of the Russian Far East and provinces of northeastern China; Primorskii Krai of Russia and the Northern Hamgyeng Province of DPRK).

This recent integration process coincided, in time, with a growing concern in these countries about environmental protection issues, about adoption of government concepts of sustainable development, and about development of sustainable natural resource use programs.

The distinguishing features of China's modern economic development are its rapid growth rate (up to 10% GDP per year) and the resolution of food issues, a result, in part, of expanded agricultural lands in northeast China. Russia experienced marginal economic growth in this period (up to 3% GDP per year); this growth was largely a result of increased exploitation of natural resources. Changes are occurring in DPRK, where construction of a free economic zone "Rajin-Sonbong" is underway.

Increasing trade turnover among countries in northeast Asia is stimulating regional border development. Trade serves two basic functions: guarantees external economic ties of the countries involved and solves internal economic issues.

Regional economic ties are evolving, geographically, in special territories that include the border regions of two or more cooperating countries. These territories are called international transboundary territories (Kolosov, 1991).

2. Area Studies and a Review of Cooperative Transboundary Projects

The area studied encompasses an international transboundary territory that includes the southern portion of the Russian Far East, northeast China and northern provinces of DPRK (Figure 1). In Russia these territories are part of the Far Eastern Federation Region and are located in Amurskii and the Jewish Autonomous Oblasts, in Khabarovskii and Primorskii Krais. In China these territories are located in Heilongjiang and Jilin Provinces, and Autonomous Region of Inner Mongolia. In DPRK this is Northern Hamgyeng Province.

The cooperative transboundary projects carried out can be divided, according to A. Guni and T. Baushi (2002, 12), into:

- "Border projects carried out between countries, but at the level of the border region;
- Transnational projects that encompass geographically and historically closely connected regions of various countries;
- Interregional projects that are carried out by several countries that do not necessarily share a common border."

Let's look at projects in the post-Soviet period (since 1992); during this period promotion of border ties was a special priority. With the democratization of Russian society, with the opening of its borders to trade as well as with the changes in economic policy in China, special border trading zones were created; in China special tax benefits were established. This led to a rapid growth in commodity turnover and tourism. In Russia a series of transportation crossings were created and infrastructure developed, events seen as local economic development in border regions. Geographically, these projects were executed near existing transportation (automobile, railroad, river) arteries between countries. Six successfully developing projects of this type can be identified: Blagoveshchensk - Heihe (Amurskii Oblast - Heilongjiang Province), Khabarovsk - Sungari (Khabarovskii Krai - Heilongjiang Province), Turii Rog - Mishan (Primorskii Krai - Heilongjiang Province), Pogranichnyi - Sunfunkhe (Primorskii Krai - Heilongjiang Province) and Kraskino - Hunchun (Primorskii Krai - Jilin Province). The negative impacts from these projects are not only the worsening of the environmental condition at the local level but also indirect impact on more remote

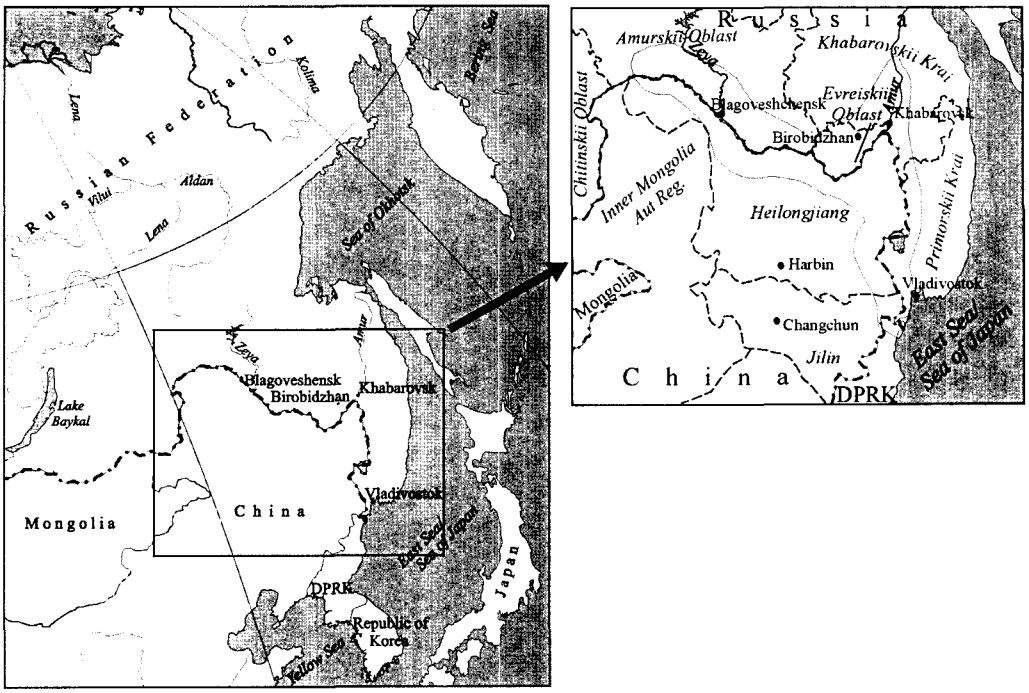

Figure 1. Study Area

regions. For example, the growing demand for traditional Asian medicines has significantly increased poaching of the Amur tiger, musk deer, bear gall bladder, pine nuts, grass-wrack and mollusks. The huge demand in China for timber has also resulted in an increase in timber harvest, including illegal timber harvest.

We must also look at attempts in this period to create free economic zones (FEZ) in border regions. In the Russian Far East the best known are FEZ "Nakhodka" and FEZ "Komsomolsk-na-Amure," and in DPRK - FEZ "Rajin-Sonbong". The FEZ in Russia, unfortunately, have not for various economic reasons, taken root while the DPRK's FEZ "Rajin-Sonbong" has developed rapidly. These border projects could potentially become transnational since their implementation inevitably sets a tone for increased economic ties.

The worsening environmental conditions in border regions led to a series of regional environmental protection projects to develop specific recommendations to protect biodiversity and to improve the protected territories network. The Bikin Project (Bocharnikov *et al.*, 1997), the Protected Territory Network Improvement Project (Kachur and Kosolapov, 1995) and the Chuguevskii Project (Stepanek, Dyukarev, Karakin et al., 1996) were undertaken in Primorskii Krai.

Transnational projects during this period developed land use recommendations for transboundary territories; these projects recommended functional zoning for different land use types. The "Ussuri Project" was carried out between 1993-1996 (A sustainable..., 1996) and the "Khanka Project" (Diagnostic..., 2001) between 1998-2000. Environmentally Sustainable Development, Inc. (USA) managed the "Ussuri Project" and UNEP - the "Khanka Project". The main achievement of these projects was the development of environmental restrictions on land use. Without going into the details of these projects, we should note that the underlying, defining principle of transboundary ter-

ritories (Ussuri River watershed; Lake Khanka watershed) was a basin approach.

Another project was a habitat assessment carried out for the Far Eastern leopard and the Amur tiger in southwest Primorskii Krai and in the eastern portions of Jilin Province (Miquelle, Pikunov, Yang et al., 1998). This project's main goal was to evaluate habitat in a transboundary region, and specifically, in similar ecosystems of the southern subzone of coniferous broad leaf deciduous forests.

South and North Korean, Chinese, Russian and Mongolian specialists and scientists have carried out interregional projects. Various projects were undertaken as part of the Tumen River Strategic Action Program. This project examined not only economic conditions in the TREDA zone (Economic map..., 2000), but also conducted a transboundary diagnostic analysis of environmental conditions in the Tuman River watershed and adjacent regions (TDA, 2002). A Strategic Action Plan was complied to protect the environment during future economic development of the region (SAP, in print). Geographically the TREDA map represents not only economic conditions in the immediate Tuman River watershed, it also covers other significant territories in DPRK, PR of China and Russia. The geographic principles applied to select territories for the TREDA zone, however, were obscure. An economic and political agenda appears to have dominated consideration of how to determine the boundaries for transboundary territories.

Transboundary diagnostic analysis of the Tuman River watershed included a study of the environmental condition of the river's watershed in DPRK, PR of China and Russia. The border territories of the south of Chitinskii Oblast of Russia, Eastern Mongolia and Inner Mongolia Autonomous Region of China were also included in this analysis. This project used a basin approach to identify transboundary territories and an attempt was made to analyze an entire steppe ecosystem. This project, however, failed to adequately define the borders of transboundary territories.

Future interregional projects will address the following types of activities: a) construction of large-scale transportation arteries; b) completion of a of protected territory network; c) development of a sustainable natural resource use program for the Amur River watershed. The planned uniting of the Trans-Korean Railway with the Trans-Siberian Railway will have negative environmental impacts not only in transboundary territories but also in areas not directly adjacent to the border. Construction of major oil pipelines from southern Siberia and Sakhalin Island to the south of Primorskii Krai to transport oil and gas to Asian markets is also fraught with danger. Environmental risks associated with implementing transboundary projects can be reduced by creating a transboundary bioshpere reserve ("zapovednik") in the lower drainage of the Tuman River in Russia, DPRK and PR of China. All these issues must be considered when sustainable natural resource use policy in the Amur River watershed is developed. Should this project be carried out, its complexity will have a determining influence on the improving of the environmental condition of one of the world's largest regions.

3. The Features of Transboundary Territories

What methodological conclusions can be drawn from these projects relative to the identification of transboundary territories? First, the basin principle was applied and successful implemented. Second, an administrative principle was often used to designate the boundaries of transboundary territories: inclusion of a territory to achieve a political goal. Third, an attempt was made to analyze complete and similarly functioning ecosystems although an exact determination of their boundaries was beyond the scope of the research.

These projects provide an opportunity to characterize the features of transboundary territories. The

Large Soviet Encyclopedia-Dictionary (1983) defines the concept trans (from the Latin trans: through, across, beyond) as: 1) movement through, across space; 2) movement after, displacement beyond; 3) means used to cross a space.

Geographically, transboundary territories have a certain, specific features that can be classified according to the definitions given above:

a) Movement across space - this is one of most characteristic features of "displacement across a border" (transgranichnost' in Russian). Dynamism defines transboundary territories, as a whole or as individual zones, and this dynamism is defined not only by natural occurring migrations of birds, terrestrial and aquatic mammals, air and water masses but also by the movement of goods, human traffic, energy, pollution;
b) Movement after, displacement beyond - this concept defines the geographic space within a transboundary territory in its entirety and is characterized by stable forms of spatial displacement across borders. An example is the distribution of similar types of natural elements and structures within a single system (steppes, mountain ranges, wetlands, watersheds of large rivers, etc.). Displacement within a transboundary territory with common commercial links defines the stability of transboundary forms of economic activity. An example is a unified transportation system: railroads and highways, pipelines, etc.;
c) Means used to cross a space - this implies the means by which something is moved across a geographic space. For example, goods move by air, by river, by road, by train, etc.

Transboundary territories show unity but also characterized by a range of contradictions that must be considered during analysis. The unity of transboundary territories is defined by the boundaries of a total geosystem, and most importantly, by the unified natural laws of functioning geosystems, by the interrelationship and the mutual conditionality of the natural and socio-economic processes taking place within. In the Concept of Sustainable Development, the unity of different pieces of a transboundary territory is defined by the cohesion of the ultimate goal: support for environmentally sustainable development. The socio-economic and environmental spheres most vividly demonstrate the contradictions characteristic of transboundary territories. The contradictions are reflected in different degrees of commercial development and in different levels of existing (reversible or irreversible) environmental impact. They are defined by the different economic development strategies (past and current) in each country. And they are driven by environmental restrictions on commercial activity and a desire to extract short-term benefits at the expense of long-term. An example is illegal timber harvest in border regions of the Russian Far East and the timber's export to border areas in China where there is an extreme shortage of raw materials.

This example illustrates the different baseline conditions present in various areas of a transboundary territory when an attempt is made to pursue a sustainable development project. Economic, social, environmental and institutional sustainable development indicators for international transboundary territories can differ significantly and can, at times, contradict one another. Contradictions are not insurmountable and compromise is the basis for promoting sustainable development policy in transboundary territories.

A number of basic, geographic scenarios for transboundary territories can be identified:

- Homogeneity of eco-geographical conditions and heterogeneity of socio-economic conditions. This is the most typical scenario for transboundary, intergovernmental territories where borders are located within a single territory but the socio-economic development of the countries involved is at different levels.
- Heterogeneity of eco-geographical conditions and heterogeneity of socio-economic conditions. This scenario repeats much of the above but occurs

when boundaries of a transboundary territory are based not on physical-geographic approaches but on political and economic ones. The boundaries of a transboundary territory can, in this case, take in large territorial expanses. An example of such a division is the territory of the TREDA Project (Map TREDA, 2000).

- Homogeneity of socio-economic conditions and heterogeneity of eco-geographic conditions. This scenario characterizes free economic zones created in border territories of two (or more) countries. This occurs when a) the territory of the FEZ covers different physical-geographical characteristics than the general territory and b) transboundary FEZ is created within a single territory.
- Homogeneity of eco-geographic and socio-economic conditions.

4. Methodological Aspects of Identifying International Transboundary Territories

Principles of identification, as a methodological issue, must be addressed when studying transboundary territories. The common principles of thematic identification zoning of territories of various classes - floristic, bio-geographic, ecoregional, natural-commercial, physical-geographic - are based on an analysis of a certain set of natural and commercial characteristics. Such approaches have important scientific and practical meaning but are inadequate for paired analysis of two interrelated values for sustainable development: the environmental value and the economic development value of the territory. This approach does not provide an answer to the key principle of territorial sustainable development: protection and improvement of the environmental condition of a territory during its economic development.

The goal of our general research is to determine the sustainability of transboundary territories in light of different types of commercial impact and to develop recommendations for sustainable natural resource use within their boundaries. This article provides a classification of international transboundary territories and their zoning.

Providing a sound basis for rational natural resource use has always been a goal of geographic science. Although the concept of sustainable development has been adopted as social development paradigm, much in the concept is yet undefined. According to Baklanov (2001), a key, unanswered question is: within which types of territory can sustainable development be achieved, and by extension, can sustainable development be achieved within any territory?

Task driven geographic research has identified the enormous impact that all forms of boundaries (natural and socio-economic) have on adjacent territories, something that underlies the concept of "transition" - in Russian: pogranichnost" (Geographical Boundaries, 1982). The undertaking of many physical-geographic and eco-geographic studies of boundary types has led to the identification of "a special type of spatial systems and units." (Preface, 1982).

Most research on system and unit types has been conducted on one section of a single territory divided by boundaries. We believe this inadequate, given current conditions. To assure for rational natural resource use and to shift to sustainable development of border territories, the full range of mutual relations arising in geographic contact zones must be accounted for and the entire transboundary territory must be examined. Only this approach provides an assessment of environmental and socio-economic conditions, of their changes, of the limiting factors and opportunities for developing the border territories of adjacent countries.

A scientifically sound basis for such an approach is to view the natural (geographic) space as an aggregate of collateral, subordinate, natural geographic units belonging to an open material system: the units are connected to one another within a geo-

graphic space that features a multitude of matter and energy streams. Thus, even local disturbances of natural systems cannot be localized. Localized impacts spread beyond individual ecosystems via various "canals," and their cumulative, end effect has regional, and at times, global significance (Isachenko, 1980). These integrated natural systems very often are divided by rigid, human made borders (for example, government or administrative) and are often viewed as separate, independent border territories and not as part of a larger whole.

The concept of sustainable development relies upon the equal significance of the natural, economic and social features of a territory. At the same time, we accept as a basis of sustainable development the natural component, and specifically, the function and the stability of a total, similar in type, transboundary territory. The natural system's stability is essential to ensure environmental, economic and social sustainability in the long term (Danilov-Danilyan, Losev, 2000).

Thus, identification of transboundary territories must be based on identification of the natural and territorial systems (or combination of systems or geosystems) from which they are formed.

The parts of a single natural territorial system are at times divided by boundaries subject to various forms of commercial use and these territories may exhibit significantly different levels of intensity of anthropogenic impact; they may also be subject to different types of environmental and economic policy. Because of their interrelation, only when all impacts on the natural system are taken into account is it possible to fully assess the condition of the total natural system, to determine key threats, to forecast development. On the other hand, a discussion of the status and development of individual parts of the natural system, of the limits on their natural stability is possible based only on the general characteristics, features and conditions of the functions of the given natural system.

In 1963 Viktor Sochava introduced the term "geosystem" as a modern synonym for natural systems. A geosystem is independent of dimension, it is a hierarchally organized whole consisting of interdependent natural components subordinate to patterns that act in a geographic space or landscape sphere (Sochava, 1963). The introduction of this term led to new definitions for both the term geosystem itself as well as for natural territorial systems. The use of these terms has stimulated an active discussion that continues to this day (Aleksandrova, Preobrazhenskii, 1978; Milkov, 1986; Myagkov, 1996 and others).

The use of these terms to define different geographic objects is directly related to the issue of zoning. In the current context, we speak of physical-geographic zoning for which there are three basic approaches for determining the boundaries of existing physical-geographic systems: individual, typological and functional. Each of these approaches based on one of three principles: genetic principl uniformity principle, principle of functional integrity.

The use of the first approach results in a network of individual, physical-geographic systems. These are open, dynamic, multi-component systems that are limited in space, whose components have dynamic unity with vertical and horizontal links and a heterogeneity of natural conditions; these are systems that change under the influence of natural processes and human impact (Fedina, 1981). Individual physical-geographic systems are also defined in terms of natural territorial or natural systems, geosystems. They, as a rule, carry geographic or personal names and include contiguous areas (Armand, 1975).

Territories, during typological zoning, are identified and mapped based on classifications of locality type and unite similar territories into one type, irrespective of whether they are located in one or several areas. Here units are zoned irrespective of the location of the leading indicators used to identify them (for example, young, rocky mountain chains; river valleys; natural solonetz, etc.) (Armand, 1952; 1975, Rodoman, 1956).

A functional integral approach to physical-geographic zoning identifies of geosystems that represent paired territories united into one system by unilateral matter and energy streams (for example, river basins; slopes of a single exposure, etc.) (Reteyum, 1975, Dyakonov, 1977).

In general, these natural systems meet Sochava's definition of a geosystem as a structurally organized whole, a system of interconnected elements that function according to the same natural law. They meet the definition of a geosystem as a natural, social, economic and/or "integral" complex object that gives the appearance of a system (Aleksandrova, Preobrazhenskii, 1978; Milkov, 1986; Alaev, 1989). Transboundary territories, if they are identified within objectively existing territorially geographic systems, are also geosystems. Several points, however, must be clarified when viewing transboundary territories as geosystems.

First, transboundary geosystems must be identified within complete natural territorial systems at the regional level (physical-geographic regions, natural zones, provinces) (Sochava, 1972).

A transboundary territory can be located within a natural system that is segmented by boundaries or it can be located in several natural systems of the same order. In the latter instance, the integrity of the transboundary geosystem implies a "transition" effect, the interaction and the interpenetration of natural bodies where the borders themselves act as spaces that accumulate and process matter and energy from adjacent spaces (Preface, 1982).

The rather large size of transboundary territories at the regional level provides an opportunity for more detailed internal partitioning. The aim of this partitioning is the differentiation of regional and topological levels of natural phenomena within transboundary territories. Pattern organization of the functions of geosystems is different at different levels. For example, at the regional level, among smaller natural systems forming the geosystem, the geosystem's dynamics and functions define one or more basic matter and energy streams. At the same time, the individual natural systems making up the geosystem may have energy and matter streams that take different directions, that operate at other levels of order or that operate at the same level of order. In addition, these systems may have varied formation and function features that are similar to a greater or lesser extent.

Second, within a transboundary territory there exist, aside from complete natural systems, other geographic territorial systems (economic, social, protected territories, etc.). These have specific spatial and functional relationships with specific types of interdependence. Accounting for their impact on the natural basis of transboundary territories is an essential condition for assessing functional stability.

Sochava pointed out that a geosystem, by essence natural, absorbs all transformations arising from economic and social factors. The geosystem is entirely a product of a modern geographic process that forms a geographic space or landscape geographic space (Sochava, 1978).

Sochava's two-tier classification of a geosystem (1972; 1978) is based on the separation of the homogeneous (geom) and the heterogeneous (geokhor). These two tiers are both independent and mutually conditioned. Valerii Mikheev (2001, pg. 50) noted that "the application of a two tier classification system leads to the logical resolution of a zoning problem: the homogeneous onset that is expressed within a specific territory blends, so to speak, into the motley mosaic of the geokhor. The artificial separation between typological and regional levels of the geosystem is thus removed." The key element in Sochava's two-tier system is the need for classifications that assess the functional links of geosystems at not just different hierarchal levels but that also assess their functioning and interaction of the same level.

A comment is necessary on the basin principle of territorial partitioning. Here the basin is viewed as "a special natural object, a natural, highly intact geosystem that combines an abiogenous basis with a specif-

ic set of functioning biota. A basin is the most appropriate scale for an all-encompassing application of a systematic approach. A basin has crests that are specific and that are clearly designated on site and on a map. Basins are the most objective, natural basis for deciding any question or problem in natural resource use" (Korytnyi, 2001. pg 39). The basin principle of territorial partitioning is now generally recognized and widely used to resolve sustainable natural resource use problems (Korytnyi, 2001; Antipov, Fedorov, 2000; Reteyum, 1977; Zhekulin, 1988).

Analysis of international basins (rivers, lakes, seas) is also undertaken to develop sustainable natural resource use programs (Kolosov, Bibanov, 1991). The authors do not exclude using a basin principle when identifying international transboundary territories. Several problems, however, must be pointed out at the regional and the topological levels.

A territorial feature is the coincidence of state borders with large transregional rivers, such as the Amur River or its tributary, the Ussuri River. These rivers form the basis for the functioning of lower category river geosystems, thus defining the functional, dynamic links and the integrity of the hydrology of natural systems on one side of the basin (from the point of view of a state border). In other words, the identification of transboundary geosystems at the regional and topological levels do not always result in typological and functional integrity. This can significantly hamper analysis on how transboundary geosystems function.

In mapping transboundary territories, it should be noted that the south of the Russian Far East has been studied in great detail, although most of the research has been within individual ecosystems or administrative districts of the federation. The material for the "Geobotanic Map of the USSR" (1956), for the "Vegetation Map of the Amur Watershed" (1968), for the Physical-Geographic Zoning of the USSR (Gvozdetskii and others, 1968) and for the "Forest

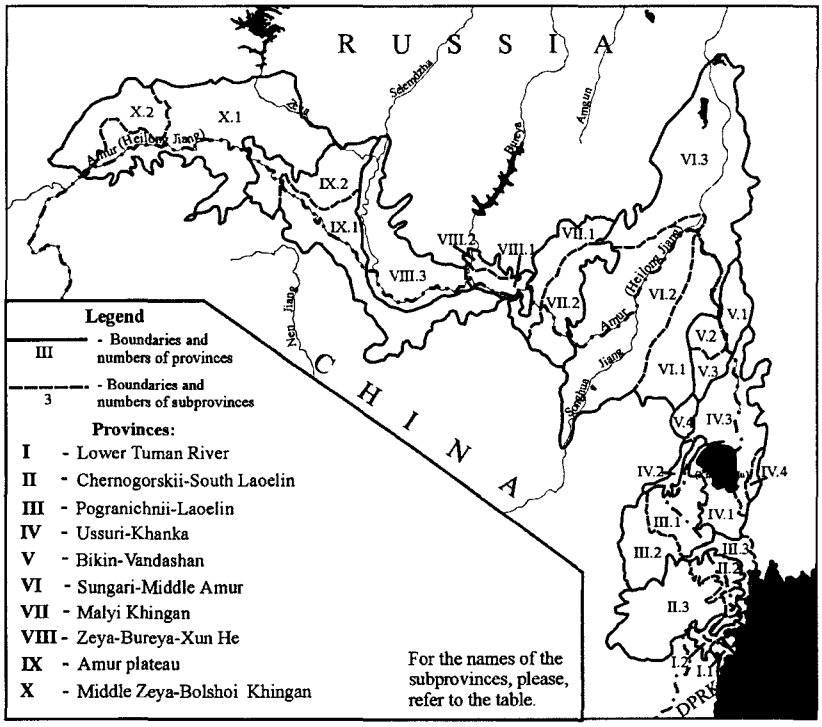

Figure 2. This scheme of international transboundary territories in the south of the Russian Far East

Table 1. Classification of International Transboundary Geosystems at the Regional and Topological Levels in the South of the Russian Far East Mountains

Order of Dimension	Planetary	Regional	Topological					
Geokhor Level	Ph/G Belt	Group of Ph/G Sub-Regions	Sub-continent	1 Ph/G Sub-Region (Zonal Belt or Altitude Belt)	2 Natural Zone	3 Sub Zone	4 Provinces	5 Sub-Provinces
Name of Geokhor	Northern Temperate	Nemoral	Eastern Asia	Eastern Manchurian Mountains	Coniferous Broad Leaf Deciduous Forests	Southern	I. Lower Tuman River Meadow Wetland	I.1. River Mouth I.2. Lower Tuman River
							II. Chernogorskii-Southern Laoelin Low Mountain Coniferous Broad Leaf Forest	II.1. Chernogorskii II.2. Borisovskii II.3. Southern Laoelin
							III. Pogranichnii-Laoelin Low Mountain Coniferous Broad Leaf Forest	III.1. Pogranichnii III.2. Laoelin III.3. Suifunskii
				Khanka Lake Region	Prairie / Coniferous Broad Leaf Deciduous Forests	Middle	IV. Ussuri-Khanka Accumulative Plain with Meadow Wetland Vegetation and Oak Groves and Sparse Forest	IV.1. Western Khanka IV.2. Higher Mulinghe River IV.3. Mulinghe-Ussuri IV.4. Foothils
				Sikhote-Alin / Eastern Manchurian Mountain	Coniferous Broad Leaf Deciduous Forests	Northern / Middle	V. Bikin-Vandashan Low Mountain Coniferous Broad Leaf Forest	V.1. Bikino-Guberovskii V.2. Northern Vandashan V.3. Central Vandashan V.4. Southern Vandashan
				Middle Amur / Amur-Sungari	Coniferous Broad Leaf Deciduous Forests	Northern / Middle	VI. Sungari-Middle Amur Accumulative Plain with Broad Leaf Deciduous Forest, Meadow Wetland	VI. 1. Naolihe-Lower Ussuri VI.2. Sungari-Amur VI.3. Middle Amur
				Bureinskii Mountains / Malyi Khingan	Coniferous Broad Leaf Deciduous Forests	Western	VII. Malyi Khingan Low Mountain Coniferous Broad Leaf Forest	VII.1. Malyi Khingan VII.2. Sutaro-Pompeevskii
				Amur-Zeya /Malyi Khingan	Coniferous Broad Leaf Deciduous Forests/Taiga	Western /Southern	VIII. Zeya-Bureya-Nun Xe Erosion-Accumulative Meadow Steppe with Larch-Birch Sparse Forests	VIII.1. Southern Bureya Amur VIII.2. Northern Bureya Amur VIII.3. Lower Zeya-Nun Xe
							IX. Amur Lower Mountain Plateau with Oak, Pine-Larch Forests X. Middle Zeya-Bolshoi	IX.1. Zeya-Amur IX.2. Amuro-Sakhalyan
				Amur-Zeya /Bolshoi Khingan	Taiga	Southern	Khingan Low Mountain Forest with Larch Groves and Grasslands and Forest Swamps	X.1. Urkan-Bolshoi Khingan X.2. Yankanskii Foothills

Ph/G Physical-Geographic

Atlas of the USSR" (1969) used to compile the "Landscape Map of the USSR (1987) is the basis for natural zoning. Yu. K. Efremov (1956) undertook the physical-geographic zoning of northeast portion of China. The Ecoregion Map (Global 200, 2000) is the latest attempt to conduct transboundary zoning.

Identification of transboundary geosystems must proceed according to a set of indicators. We agree with David Armand that the use of a combination of indicators will provide a less credible result than multistage zoning (Armand, 1952; 1964; 1975).

Figure 2 provides the zoning for international transboundary territories in the south of the Russian Far East. The Table is an example of their classification based on Sochava's theory (1972).

Our classification and zoning stems from the following definition of an international transboundary territory:

An international transboundary territory is a specific territory which supports commercial activity or is a territory that could support commercial activity located within two or more countries whose natural basis is a single geosytem at the regional level that is characterized by common types of function and that has similar structural and hierarchical landscape organization at different locations along the border.

There are ten international transboundary territories in the south of the Russian Far East. We have focused on the regional (province) and upper topological level (sub-province) since we believe that the basic conclusions about functional sustainability of geosystems, given current anthropogenic impact, must be drawn expressly from an analysis of the geosystems of these hierarchical levels. This analysis naturally suggests further subdivision and study of the territory since without such information it is impossible to make regional generalizations.

5. Conclusion

The study of international transboundary territories is relatively new and one focus of this research is how geographically contiguous countries can find ways to cooperate. Many countries are looking to promote consensus policy for sustainable natural resource use. National environmental safety policy drives the need to coordinate sustainable natural resource use policy in border territories. Policy guidelines must be based in a study of the fundamental patterns for the functioning of single geosystems.

The principle of the functioning whole, of uniformity, of structural homogeneity of transboundary geosystems must, in our opinion, be based on a study of the reserves of sustainability and commercial capacity in a transboundary territory. Key conclusions must be drawn from an analysis of transboundary geosystems at the regional level; the processes occurring at this level help define the fate of the biosphere (Sokolov, Puzachenko, 1988; Seledets, 2000).

Our future research on international transboundary territories will identify what kinds of commercial use are occurring at various territorial levels within a geosystem, their intensity and what relationship these activities have to the degradation of native ecosystems. This research will require data from deciphered satellite images and broad based statistical data on local economic activity of the countries in transboundary regions.

The key restraint in this study is that administrative and natural boundaries do not correspond. Unfortunately, statistical data are "bound" to administrative divisions, so we can only operate with such designations. We must use subdivided administrative districts of different administrative regions of the Russian Federation or the provinces of DPRK or PR of China to draw a general picture of territorial use in a transboundary geosystem, its condition in what are its natural, and not administrative boundaries. Their "reformatting" within transboundary geosystems allows us to use statistical socio-economic indicators to describe anthropogenic impact on geoecosystms.

These data provide an opportunity to determine objective indicators for sustainable territorial development and to make recommendations on the development and practical implementation of sustainable natural resource use programs within transboundary territories. To discuss sustainable natural resource use within transboundary territories of one country alone is impractical since policy work must be closely coordinated with the natural resource use policy of adjacent, transboundary countries. Coordination of sustainable use practice must begin with a uniform set of procedures based on how transboundary geosystems function.

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Note

1) These territories have state borders that serve to divide and unite (Baklanov, 2000; 2001). These territories give rise to special structures and functions that promote integration. The urgency to assess international transboundary territories comes from a need to evaluate the ecological interdependency of processes and events. From the environmental point of view, any negative event in the border region of one country affects the border regions of another. This interdependency give rise to two fundamental principles of environmental safety: 1) the right of every government, every nationality and every citizen to a safe environment, and 2) the well being of one government or group of governments must not be had at the expense of others or separately from others (Kolosov, 1991).

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